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Integrated Inventory Management Key to Organizational Profitability and Efficient Delivery

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ABSTRACT

Inventory can be one of the most expensive assets of an organization. It may account for than 10% of total revenue or 20% of total assets for some organization. Although companies in the manufacturing sector usually carry more inventory than service firms, effective inventory management is nonetheless important to both manufactures and service organization. The focus of this work is to show the integration of inventory management as a key to organizational profitability and efficient delivery. The definitions of inventory as a lifeblood of any business, the need for inventory and its control, determining safety stock and some other relevant issues on inventory management had been emphasized in this work. Various authors, experts and professionals work has been cited reviewed for better understanding. Among them are:- David Burt et al (8^{th}) edition: Supply management, A.K Datta (2^{nd} edition) Materials Management, Joel D. Wisner et al (2^{nd} edition) principles of supply chain and some relevant authors on Inventory Management which has been cited at the back of this work.

DEFINITION OF INVENTORIES

Inventories are stock materials of nay kind stored for future use, mainly in the production process. Thus, today's inventory is tomorrow's production. However, semi finished goods awaiting release for sales are also included in the board category of inventories, which are nothing but idle resources of any kind having some economic value, either awaiting conversion or use in future.

Apart from these, there are also many indirect materials, such as, maintenance materials. Fuels and lubricants, etc which are used in a manufacturing organization they are also classified as inventories of materials for future use. But they differ only in their use and classification from raw and other direct materials. All of them earn nothing, yet they are badly required to be stocked and to be used as when the needs arise.

INVENTORY MANAGEMENT

Inventory management can be defined as a process of economically acquiring the material needed by an organization, and effectively maintaining these materials at the various levels of the organization's operations, while ensuring an efficient utilization o of the materials in a way that enhances the profitability of the organization.

Inventory control is the managerial activity performed to ensure that materials sufficient for uninterrupted organizational operations are available both in quality and in quantity. The philosophy of this concept is that the organization neither suffers a stock-out situation nor ties down large capital in form of heavy stock carrying.

THE NEED FOR INVENTORY AND ITS CONTROL

Inventories of materials are needed by all manufacturing organization big or small. But Inventories tend to becomes big without proper control. Materials and inventories serve some social purpose in industries which stems form some economic motives. Broadly, they may be classified under three groups, viz speculation, transaction and precaution. Typically, speculative motive which affords ample scope for holding large amount in Inventories is not important for purposes of industrial activity. The transaction motives are more important here. The transaction motive results from the desire to match inflow and outflow and materials under certain controlled conditions. Precautionary motive arises out of the inability to predict future demands precisely and getting the materials ready in time, without incurring some extra costs. Thus, there also arises the need to maintain some safety or butter stock in order to maintain the smooth flow of materials without pairing production. But, as more and more stocks of materials are held, this not only entails greater investment, but carrying other associated costs increase in frequency of buying the cost of ordering and processing increase. Also, the cost of stock-out poses economics problem. Thus, inventory control is a major MM function, which requires the reduction in materials costs without impairing operational efficiency and, therefore, needs careful attention.

The analytical approach to Inventory control is fundamentally based on cost-study. It is balancing of some opposite costs which is well enunciated in EQQ formulation, but further refinements are necessary the situation dictates. Sometimes, there are several associated with inventory, but there is always one in one direction. The resolution of the problem generally requires two basic questions to be answered: (1) how often to order to order, and (2) how much and then determining these two basic question-answers precisely requires cost-information, and the solution. Not, all inventory problems however, demand that these questions be answered.

Sometimes, the Inventory problem is so complex that it may not be possible to obtain all the information necessary. In either case, we may be satisfied with a sub-optimal solution which seeks to improve the existing condition without concern for the optimal course of action. In practice, we might effect large savings without necessarily going through an optimal course of action. Thus, while inventory control is a major part of materials activity, reducing inventory does not always ensure operational efficiency. This is where we must strike a balance.

There is necessarily a basic conflict between economics and business objectives of any undertaking, which are:

1. Larger sales turnover through better customer-service,
2. Lowering of production costs through smoother production-runs, keeping the above two in view.
3. Lowering of investment through a reduction in need for inventories keeping the above two in view.

Inventory control ensures that a working balance must be struck between them so as to obtain the maximum overall costs and efficiency.

TYPES OF INVENTORIES

There are many types of inventories, such as raw materials and production inventories, components and service parts, as work-in-process and finished goods inventories. All of them do not necessarily require the same treatment and, therefore, policy with regard to each may also differ, according to their types and need in different types of industries. They may also be functionally classified as; 1. Movement inventories, 2. Lot-size inventories, 3. Anticipation inventories, and 4. Fluctuation inventories, etc. according to the functions they are required to perform. However, in general, their treatment follows from their needs and cost-benefit analysis.

Thus broadly, inventories may be classified as under;

Raw materials and production inventories: These are raw materials and other supplies, parts and components which enter into the production process and generally from the product.

In-process inventories: These are semi-finished work-in-progress and partly finished products formed at various stage of production.

MRO inventories: Maintenance repairs and operating supplies which are consumed during the production process and generally do not form part of the product itself (e.g oils and lubricants, machinery and plant spares, tools and fixtures, etc) are referred to as MRO inventories.

Finished goods inventories: These are complete finished products ready for sale.

Inventories may also be classified on the basis of their functions as under;

Movement or transit inventories: It arises because of the time necessary to move stocks from one place to another. The average amount can be determined mathematically thus;

Where, S represents the average rate of sales (say, weekly average) and T, the transit time require to move from one stage to another in a week, and I the movement needed. As for examples, if it takes three weeks to move materials to a warehouse from the plant, and if the warehouse sells 110 per week, then the average inventory is 110 units x3 time= 330. In fact, when a unit of finished stock is manufacturing and ready for sale, it must remain idle for movement to the warehouse. Therefore, the plant stock on an average must be equal to three weeks, sale in movement.

Let-size inventories: In order to keep costs of buying, receiving, inspection than are necessary and handling low, larger quantities are bought than are necessary for immediate need. It is a common practice to buy some raw materials in large quantities in order to avail of quantity discounts.

Anticipation Inventories: Such inventories are carried to meet predictable changes in demand. In case of seasonal variations in the availability of some raw materials, it is convenient and also economical to build up stocks where consumption patterns may be reasonably uniform, and predictable.

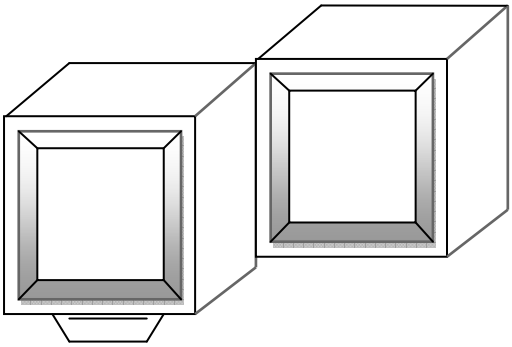
Of the types of inventories, discussed above, the lot-size, fluctuation and anticipation inventories may be said to be ‘organization inventories’. As more and more of these basic types of inventories are carried into stock, less coordination and planning are required. Also less clerical, administrative and other efforts are needed and greater economics can be obtained in handling, manufacturing and dispatching. But, the difficult is that gains are not directly proportional to the size of the inventories maintained. As the size increase, even if they are efficiently maintained and properly located, gains from additional stocks become less and less prominent. The cost of warehousing, large quantities grow at an even faster rate than the inventories themselves. As such, the basic problem is to strike a balance between the increase in costs and the decline in return from holding additional inventories. Striking a balance in a complex business situation is not easy, simply through intuition alone. Cost, and to be sure, the balancing of opposite costs, lie at the heart of all inventory control problems, for which cost-analyses are necessary, to which shall turn in this chapter.

As has already been said, even a typically medium-sized industrial organization uses 10,000 to 50,000 of different items which are carried in inventory. Initial planning and subsequent control of such inventories can only be accomplished on the basis of knowledge about them. Consequently, the starting point in inventory management and control is the development of a stores catalogue, which is more or less comprehensive and complete in all respects. All inventory items should be fully and carefully described and a code number should be allotted. Similar items should be grouped together and standard codification should be adopted.

INVENTORY CONTROL

The two-bin System

One of the earliest systems of inventory control is the two-bin system, which is a simple method of control exercised by two simple rules. One is when the order should be placed, and the other what quantity should be covered. Figure 15.1 shows this simple method. Two bins contain, say, mild-steel bolts and nuts. The bolts and nuts are issued from the first bin as at when required, and as soon as the first bin is empty, more bolts and nuts are ordered. The replenishment arrives just when the second bin is empty. While delivery is awaited the buts and bolts from the second bin is empty. While delivery is awaited the nuts and bolts from the second bin are issued. When the delivery arrives then both the bins are again filled in. Such a method is only appropriate when consumption rate is constant, that is to say, it is a deterministic system. We know from experience, that amount of nuts and bolls are necessary for a given period as well as their rate depletion.



MAX-MIN SYSTEM

Under this method, maximum level and minimum level are fixed Re-ordering I is done after a period of review and order or re-order is placed when the quantity touches a certain level.

Suppose, you have an item in inventory for which the maximum is fixed as, 1,000 units and minimum quantity to be held in stock is 250 units, previous experience shows that a safety stock of 250 is quite sufficient. However, if during the preceding two mouths, consumption rate increases to 300 units per mouth on an average, and, if the lead-time is taken to be two mouths, then he stock will soon run out, either if the delivery is not received just after two mouths, or if during the subsequent mouths, consumption rate increase. The weakness of this system is;

1. Stock level are actually fixed at a lower, since managers have no time to study inventory levels of individual items.
2. Re-order points are safety stock level once fixed are not frequently change after study.
3. Delay in postings makes the records useless for purpose on control, as often even a critical item can be held up for want of posting, which otherwise would have show tat the re-order point has been touched.

Thus, we may conclude that in any scientific inventory management and control system, control is exercised through the various levels, and the order quantity;

1. Maximum level,
2. Minimum level,
3. Order or re-order level or control point, and
4. Order quantity.

There are two basic inventory control system;

1. Periodic Review System, and
2. Fixed Order Quantity System

Periodic review system: This is a time –bound system which requires periodic reviews of the stock-level of all items. Here, period of review is fixed either, there mouths, or once in a year, when requirements of all items are worked out afresh, and the quality is varied. This system works well for production of raw materials and components for which long lead-time are necessary.

Fixed order quantity system: Under this system, the order quantity is fixed but the time is varied. This system recognized the fact each item in the inventory possesses its own unique characteristics and optimum order quantity. Designing of this system requires consideration of many factors, such as, price, usage rate and other pertinent factors. Maximum and minimum levels are determined for easy inventory items and an order or re-order point is established in between two levels.

The order point in computed in such a manner that by the time new supplier are received, the stock balance will fall to the minimum and then be replenished again to the maximum. The major advantages of this are;

(1) Easy item can be procured at the most economic price and quantity, and

(2)Purchasing and inventory control people automatically pay attention to the items when they need it.

Thus, in order to devise a good inventory control system, we have to consider the following;

1. What to order, and
2. When and how much.

The first involves planning with due regard to production and marketing requirements. The second has two aspects; (i) order point, and (ii) order quantity.

Order point will be discussed along with safety stock or buffer stock, since subtle influenced of time in transit on total inventory are closely to the safety stock provisioning to create an impact on inventory control.

At this point it would be better to draw a distinction between accounting cost and operational costs. The former is based on historical cost-concept as used for financial reporting, and the latter is, by and large, used for day-to-day decision-making and is insensitive to small variations. Accounting system, typically distinguishes there types of costs, viz direct costs and overheads. As against the principles and consistency of accounting costs, the definition of costs in an inventory system may vary from time to time, depending upon the length of time being planned and other circumstances. However, the objectives underlying inventory control is to minimize the total cost of procurement, storage, handling,

INVENTORY COSTS

To bottom line of inventory management is to control inventory costs and minimize stock outs. Inventory costs can be categorized in many ways-direct and indirect costs, fixed and variable costs, and order and carrying costs.

Direct costs: are those that are directly traceable to the unit produced, such as the amount of materials and labor used to produced a unit of the finished goods.

Indirect costs are those that cannot be traced directly to the unit produced, and they are synonymous with manufacturing overhead. Maintenance, repair, and operating supplies, heating lighting, buildings, equipment, and plant security are examples of indirect costs.

Fixed costs are independent of the output quantity but **variable costs** vary as a function of the output level. Buildings, equipment, plant security, heating and lighting are examples of fixed costs, whereas direct materials and labour costs are variable costs. A key focus of variable costs management is to control variable costs since fixed costs are generally considered sunk costs.

Order costs are the direct variable costs associated with placing an order with the supplier, whereas **holding or carrying cost** are the costs of incurred for holding variable costs in storage. Order costs include managerial and clerical costs for preparing the purchase, as well as other incidental expenses that can be traced directly to the purchase. Examples of holding costs include handling charges, warehousing expenses, insurance, pilferage, shrinkage, taxes and the cots of capital. In a manufacturing context, setup costs are used in place of order costs to describe the costs associated with setting up machines and equipment to produce a batch of product. However, in inventory management discussions, order costs and setup are often used interchangeably.

Inventory investment

Inventory serves many important functions for manufacturing and service firms, however, excessive inventory is detrimental to a firm's financial health and competitive edge. Whether inventory is an asset that contributes to organizational objectivce or a liability depends on its management. The chapter opening feature, supply chain management in action, demonstrates that even a huge retailer with sophisticated information technology such as Wal-Mart must diligently monitor its inventory investment to ensure that is not adversely affecting the firm's competitiveness.

Inventory is expensive and it ties up working capital. Moreover, inventory requires storage space and incurs other carrying costs. Some products such as perishable food items and hazardous materials (hazmat) require special handling and storage that add to the cost of holding inventory. Inventory can also deteriorate quickly while it is in storage. In addition, inventory can become obsolete very quickly as new materials and technologies are being introduced. Most important, large piles of inventory delay a firms ability to respond a swiftly to production problems and changes in technologies and market conditions.

Development of inventory catalog

Here inventory items are described, identified by manufacturers part number, cross-indexed by users identification number if necessary, and classified generically for indexing purposes, coded and then placed at the disposal of all personnel. Catalogs of this types serves as a medium of communication as to whether an inventory items is available or and correct records through the reduction of duplicate records for identical parts.

ABC inventory analysis

This is the division of inventories into categories of total annual usage, so that the more valuable items can be recognized for special attention 'A' items are the most valuable 'B' are intermediate and 'C' are the least-value items. This is also called Pareto analysis.

ABC analysis aids the development of policies and procedure for handling A.B,C items. It also provides a sound basis for fund allocation on individual inventory items. It also reduces possibility of management error in judgments. Inventory analysis is analogous to manpower analysis in human resources management. Both are made up of description, as well category and functional specifications.

Inventory control system

Inventory control is concerned with the control of the physical quantities and the monetary values of inventory items at predetermined levels or within safe limits. There are three types of inventory control system viz.

The cyclical ordering system

This is a time based system involving scheduled periodic reviews of the stock level of all inventory items. Order quantities vary for different materials. Time interval for ordering is constant. (Q≠ Q≠Q- but T1 = T2+ Tn).

Stock levels can be monitored by physical inspection, by a visual review of perpetual inventory cards or by automatic computer surveillance. The disadvantages of the system inefficient. The system may lead to increase in inventory costs for each item(Qi≠ Q-≠Q- but T1 = T2+ Tn)..

Fixed ordering quantity system

Replenishment is based on the order quantity factors rather than on the time factor. Advantages include: materials can be procured in the most economical quantity. Attention is only devoted to items that need replenishment. Also, positive control can easily be exerted to maintain total inventory investment at the desired level simply by manipulating the planned maximum and minimum values.

(Q- ≠Q-≠Q- but T1 = T2+ Tn).

The determination of inventory level is also significant in materials management. Various levels are determined in this ways. Re-order level

(ROM) = Maximum usage x maximum lead time
Minimum level = ROL (Average usage x average lead time)
Maximum level = ROL (Average usage x average lead time)
Maximum level = ROL (Minimum usage x minimum lead time) + EOQ
Average stock level = Maximum level + minimum level

For example, calculate, the various inventory levels for a manufacturing organization having the following materials usage characteristics. Average usage is 60 units per day, minimum usage is 40 units per day, maximum usage 90 units per day, lead time 11 – 15 years and EOQ equals 100 units.

Solution

a. Recorder level (ROL) = 90 x 15 = 1350 units
b. Minimum level = 1359 – (60 x 13) = 570 units
c. Average stock level = 570 + 1910 = 1240 units

2

Materials requirement planning (MRP) system

MRP is a computer based planning and control system designed to handle large volumes of data so as to produce more timely and accurate information for decision making purposes. MRP tackles the management of production inventories in an intermittent manufacturing concern.

This computer based system challenges the traditional system that production inventories need by carried in inventory before actually required by the production. Conclusively inventory control is of vital importance in any business, large or small. The adequacy of such control may be deciding factor in its success, inadequate inventory control might well lead to its failure.

The benefits of a sound system of inventory control include:

- Stock levels are maintained at a point calculated to make the most profitable use of firm's working capital.
- Perpetual balances are always readily available for each item of stock
- Stores issued are charged to production on a uniform basis.
- Pilferage and waste of stores are minimized.
- Production is assured of continuity, as supplies are always available in the appropriate quantity and quality, and at the time and place required.

However, for inventory control to be more efficient, the warehouse of the stores must be suitably located, well planned and efficiently organized. Factors to be considered when planning and organizing the warehouse must include: location, type of building, layout of inventory items, staff, inventory system, inventory classification, stores routine (purchase requisition, reception, stores records, stores issues, treatment of surplus materials after the completion of the job, transfer of materials from job to job) and pricing of issues.

Handling of materials must be done with care at the reception, warehousing, flow and conversion stages. Handling equipment includes conveyors, trucks, palletisation and pipelines.

Inventory control techniques

i. Order cyclical approach (i.e cyclical ordering system)
ii. Economic order quantity approach (EOQ)
iii. Materials Requirement Planning approach (MRP)
iv. Just-in-time (JIT) purchasing philosophy
v. Selective inventory control (SIC) system. That is the use of ABC or paretic stock analysis (80/20 rules). That is, pay vigorous attention to 20% of items that consume 80% of materials bill than to 80% of items that consume 20% of material g
fund.
vi. Us of critical levels including recorder, minimum and maximum levels. This is called the demand and supply approach.
vii. Use of perpetual inventory control system. That is continuous checking of stock records especially bin cards and stores ledger records. Physical balance are usually valued in terms of FIFO, LIFO or moving average pricing.
viii. Use of periodic review system that is, periodic stock-taking. The internal audit often plays a vital role in this stock taking exercise.

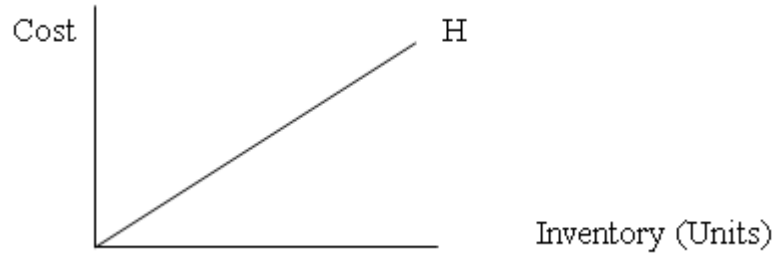
Inventory costs

Inventory costs could be categorized into three major classes they include:

Holding/carrying costs

They include costs of storage, depreciation, obsolescence, pilferage, evaporation, theft, insurance and vermin damage. Other items of costs in this category include interest on capital invested in stocks, storage charge (rent, refrigeration, air conditioning, heating and lighting) material handling cost, and stores staff, equipment, maintenance and running costs.

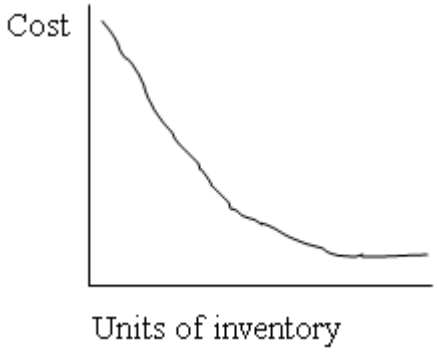
The holding cost in positively related to the units of inventory carried. Thus represents a positively sloping cure.



Set-up ordering cost

This includes the cost of preparing the other, transport/delivery cost, clerical and administrative cost of purchasing, accounting and goods reception. Where goods are produced internally, it includes the set up and tooling costs associated with each production run, plus the planning and production control costs associated with the internal order.

The ordering cost in negatively related to the items of inventory ordered. This represents a negatively slopping curve.



Stock out cost

This is the cost of being without stock. It includes the lost contribution through the lost sale caused by the stock out, cost of production stoppages caused by stock out of work-in-progress and raw materials, loss of future sales because customers may go elsewhere and extra cost associated with urgent, often small quantity replenishment order.

Inventory control purpose

The key objective of inventory control is to carry optimal level of inventory units so as not to unnecessarily tie down capital on the one hand or cause production inefficiency for want of materials on the other hand. Other purpose of inventory control include:

- To meet variation in demand with reference to finished products over a period of time e.g seasonal products
- To decouple successive stages of production so as to make possible smooth and efficient operation of a manufacturing organization
- To contribute to the firm's profit through appropriate inventory level at which money invested in inventory produces a higher rate or return
- To buffer against uncertainty,
- We also keep inventory for precautionary, anticipatory and speculative purpose
- To ensure production continuity, take advantages or price changes and reduce material handling costs.

Inventory modeling

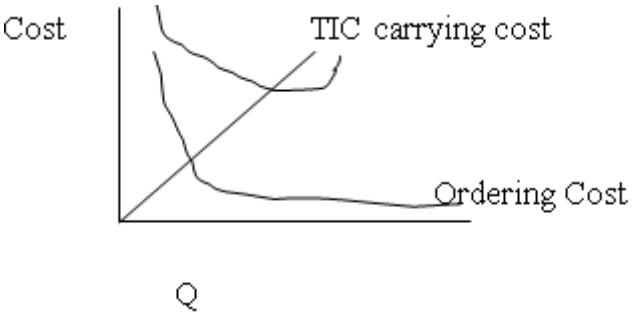
Inventory modeling could arise out of two situations:
Deterministic and stochastic (probabilistic) situations. The first one is considered here.

Deterministic situation

This could produce the simple lot size economic order quantity and economic production quantity model in an environment of certainty. Assumptions to lead us include: stock out cost is not incurred, back ordering is not allowed, annual demand (D) is constant and know, purchase cost per unit (P) is fixed, there is a constant rate of usage, there is zero inventory at each replenishment point, cots of procurement (order cost) (S) is known and does not vary, cost of storage of material (holding cost) (H) is known with certainty and does not vary, lead-time is constant, replenishment of stock is instantaneous, optimal quantity of stock is held at the pointy where holding costs is just equal to set up cost.

Optimal inventory = holding cost + set up cost
Total inventory cost = holding cost + set up cost
TIC = H (Q/2) + HB +SD/Q
TIC/ ∂QH/2 SD/Q = 0
$H/2 = SD/Q^2$
$HQ^2 = 2DS$
$Q^2 = 2DS/H$

$Q = \sqrt{2DS/H}$ EOQ= DEMAND SITUATION



Economic production quantity: supply situation

We assumed so far that we order goods, now if we represent the supplier/producer, what economic quantity shall we produce. We shall assume that demand is know with certainty for both daily and annual demand (d, D). production begins immediately after each supply, the rate of production is also known with certainty (P), average inventory at time.

$$tp = \frac{(P - d)}{2} tp$$

and the average time to produce a lot (tp = Q/P) are known with certainty, the number of production runs (D/Q) is also known, the optimal quantity shall be produced at the point where set up cost is equal to holding costs.

$$TC = \frac{DS}{Q} + \frac{(P=d)}{2p} QH$$

$$\delta \frac{TIC}{\delta Q} = \frac{DS}{Q^2} + \frac{(P-d)}{2p} H = 0$$

$$\frac{DS}{Q^2} + \frac{(P-d)}{2p} H$$

$$Q^2 (1 - d/p) H = 2Ds$$

$$Q2 = \frac{2DS}{(1 - d/p) H}$$

$$Q = \frac{2DS}{(1 - d/p) H}$$

Example

Given that the annual demand for a medicated soap is 4000 units, set up cost is 5.0, daily demand is 250 units, the production rate is 500 and the holding costs are 15% per associated costs for the supplier

$$\textbf{EPQ} = \frac{\sqrt{2 \times 4000 \times 5}}{1 - 250/500) 0.15}$$

= 730.3 units

$$TIC = \frac{DS}{Q} + \frac{(P-d)}{2p} QH$$

$$= \frac{(4000 \times 5)}{730.3} + \frac{(500 - 250)}{(2 \times 500)} (730.3) (0.15$$

= 27.39 + 27.37 = ₦ 54.78 Ans

(EOQ) Economic order quantity is an inventory related equation that determines the optimum order quantity that a company should hold in its inventory given a set cost of production inventory costs.

Formula EOQ = $\frac{2\sqrt{SD}}{p_1}$

Where: S = Set up costs
D = Demand rate
P = Production cost
I = Interest rate

LIMITATION OF ECONOMIC ORDER QUANTITY

1. The assumption of constant usage and the instantaneously or immediate replenishment of inventories are not allowed practically.
2. Safety cost is always required because deliveries from supplier may be an unexpected demand for stocks.
3. EOQ assumes that the demand is constant and known with certainty which always is not the case. Demand may rise and fall depending upon various factors leaving certain degree of uncertainty behind it.
4. Computational problems may arise and hence the number of orders to be placed may not be always 100% accurate if fractions or decimals are involved.
5. The cost of the ordering remain constant.
6. The demand rate for the year is known and even spread throughout the year.
7. The lead time is not fluctuating (lead time is the latency time it takes a process to initiate and complete) .

Need for data bank to enhance inventory analysis

In Nigeria, if inventory analysis is to be effectively enhanced, the data collection, storage and usage must be encouraged and institutionalized. Data items to be collected, stored and utilized include items of costs, actual annual demand/supply, usage rate of products/ services, average inventories for each unit of inventory, daily production runs, types of storage facilities used, inventory administrative expenses and a host of other related data both at the macro and micros levels.

There is no doubt that such a databank will aid and ensure proper analysis of inventory models, quantities and costs at all level. Management of each organization will benefit from inventory information, plan and control their operations more realistically and there and then realize intended inventory objectives as well as objectives.

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CONCLUSION

Production planning and industry management activities for the past ten years or so have been in a significant state of change. New and involving systems have spawned new and increasingly sophisticated planning and control capabilities. In some cases the more traditional inventory control systems have been replaced for certain types of application.

It is becoming increasingly difficult for most firms to control inventories effectively.
One major reason for this is the expansion of product lines and models, a second key reason is that more and more components going into the typical forms products are being purchased as fabricated parts, rather than being

produced from basic materials in the firm own shops the means in many forms, that the number of inventory items to be managed in constantly growing. And because of the increasingly technical nature of materials today, the number of naira that may be invested in inventory is growing at an even faster rate than the number of items.

In its daily operations, inventory control should be largely a series of clerical or computerized activities, carried on within a carefully detained and controlled framework. The routinization of the daily operations however often camouflages the important of sound management in this area.

At this point in the conclusion, there should be no doubt that the basic responsibility for inventory control should be with top management. The effect of poor inventory management, unfortunately, are not directly visible on the operating statement as a composite cost of inventory management. Nevertheless, in most organizations these indirect lost, dispersed and hidden throughout the operating statement, can have a significant impact on profit.

For this reaction, top management should carefully formulate and periodically review the basic policies and operating plans that constitute the framework within which the daily inventory control operation functions.

REFERENCES

Tijani 92009). *Purchasing and supply: Principles and Practice.* Pg 141-156, 2nd Edition

Lee L. (Jr) & Dobler D.W (1977). *Purchasing and Materials Management 3rd* edition (New Delhi) Tata MC GrawHill Publishing Company.

Datta A.K (2009). *Materials Management* Procedures, Text and cases (2nd edition) PHI learning private Limited New Delhi. Pg 215 - 240

Benton W.C, Jr. (2008). Purchasing and Supply Chain Management. Mc GrawHill International, 2nd Edition

Saxena (2004), Operation of Warehouse.

Kareem T.S (2011). Inventory Management. Titles Publishers. 1st edition Pg 2-10

Joel D. wisner, Keah Choon Tan, and Keong Leong G. (2008). Principles of Supply chain Management: A Balanced Approach. USA, 2nd edition Pg 215-217

Lawal & Oke (2006). Managing Inventory for profit making. Pg 3 - 4